

Work Order ID 97878

March-01-13 10:38:06 AM

97878

Page 1

Item ID: D350-748-241TRN

Revision ID:

Item Name: Crosstube Turning Detail

Start Date: 3/01/13 Start Qty: 1.00

Required Date: 3/15/13 Req'd Qty: 1.00

Reference:

Accept

N900040100

Setup Start ***NS1***

Stop ***NS2***

Cust Item ID:

Customer:

Approvals: Process Plan: MLJ

Date: 13-03-01 Tooling:

Date:

QC:

Date: SPC (Y/N):

Date:

Run Start ***NR1***

Stop ***NR2***

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

Draw Nbr

Revision Nbr

D350-748-241

G

100

0.00

100

Mori Seiki

MORI SEIKI CNC LATHE LARGE

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs on both ends as per Folio FA647

2-Turn first side as per Folio FA647

3- File transition lines smooth.

FOLIO REV: AA

DWG REV: G

1 ϕ

mmml
13/03/24

110

QC1- Inspect dimensions to dimension sheet

0.00

110

QC

Memo

0.00

Quality Control

1 ϕ

mmml
13/03/24

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA:

13/10/22 Date:

QA Closed:

Date: 13/10/23

| | | | | | |
|----------------------------------|--|--|---|--|--------------------------------------|
| Work Order: <u>97878</u> | DISPOSITION Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input checked="" type="checkbox"/> Work Order Update <input type="checkbox"/> | AGAINST DEPARTMENT/PROCESS | | | |
| Part No. <u>D350-748-241 TRN</u> | | Skid-tube <input type="checkbox"/> | Crosstube <input checked="" type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> |
| NCR No. <u>13-3154</u> | | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> |
| | | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> |
| | | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | |

| Root Cause | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|--|---------|------|-----|--|-------------------|--|---------------|----------------|------------------------------|
| Doc/Data <input type="checkbox"/> | 13/5/16 | 100 | 1 | Two Two ultra sonic measurements are over tolerance RC. material | GP 13/5/16 | Acceptable Min wall thickness is within 0.012 of dwg nominal. | GP 13/5/16 | JW 13-07-20 | DAS 16 9-83 13/7/29 |
| Equip/Tooling <input type="checkbox"/> | | | | | | | | | |
| Operator <input type="checkbox"/> | | | | | | | | | |
| Material <input checked="" type="checkbox"/> | | | | | | | | | |
| Setup <input type="checkbox"/> | | | | | | | | | |
| Other <input type="checkbox"/> | | | | | | | | | |
| Process <input type="checkbox"/> | | | | | | | | | |
| Supplier <input type="checkbox"/> | | | | | | | | | |
| Training <input type="checkbox"/> | | | | | | | | | |
| Unapproved <input type="checkbox"/> | | | | | | | | | |

FAULT CATEGORY

| Landing Gear | General |
|---|--|
| <input type="checkbox"/> Bending | <input type="checkbox"/> Bend |
| <input type="checkbox"/> Centre Not Concentric to O/S | <input type="checkbox"/> BOM/Route |
| <input type="checkbox"/> Cracks | <input type="checkbox"/> Broken/Damaged |
| <input type="checkbox"/> Crushed/Crimped | <input type="checkbox"/> Burrs |
| <input type="checkbox"/> Cuffs | <input type="checkbox"/> Contamination |
| <input type="checkbox"/> Heat Treat | <input type="checkbox"/> Countersink |
| <input type="checkbox"/> Inspection Strip in Tube | <input type="checkbox"/> Cut Too Short |
| <input type="checkbox"/> Ripples in Bend | <input type="checkbox"/> Drill Holes |
| <input type="checkbox"/> Torque Waves in Extrusion | <input type="checkbox"/> Drawing |
| <input type="checkbox"/> Turning Sequence | <input type="checkbox"/> Finish |
| <input type="checkbox"/> Wave/Twist in Tube | <input type="checkbox"/> Folio |
| | <input type="checkbox"/> Grain |
| | <input type="checkbox"/> Hardware |
| | <input type="checkbox"/> Inspection Incomplete |
| | <input type="checkbox"/> Instructions Incomplete/Unclear |
| | <input type="checkbox"/> Maintenance |
| | <input type="checkbox"/> Mislabeled |
| | <input type="checkbox"/> Misread |
| | <input type="checkbox"/> Offset |
| | <input type="checkbox"/> Out of Calibration |
| | <input type="checkbox"/> Out of Sequence |
| | <input type="checkbox"/> Outside Dimensions |
| | <input type="checkbox"/> Ovalized |
| | <input type="checkbox"/> Over/Under tolerance |
| | <input type="checkbox"/> Part Incorrect |
| | <input type="checkbox"/> Part Lost/Missing |
| | <input type="checkbox"/> Part Moved |
| | <input type="checkbox"/> Positioned Wrong |
| | <input type="checkbox"/> Power Loss/Surge |
| | <input type="checkbox"/> Pressure/Forced |
| | <input type="checkbox"/> Temperature/Cure |
| | <input type="checkbox"/> Weld |
| | <input type="checkbox"/> Wrong Stock Pulled |
| | <input type="checkbox"/> Other |

Work Order ID 97878

97878

Page 2

March-01-13 10:38:06 AM

Item ID: D350-748-241TRN
Revision ID:
Item Name: Crosstube Turning Detail

Accept

N900040100

Setup Start *NS1*

Stop *NS2*

Start Date: 3/01/13 Start Qty: 1.00 *1*
Required Date: 3/15/13 Req'd Qty: 1.00 *1*

Cust Item ID:
Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start *NR1*

Stop *NR2*

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

| | | | | | | | | | |
|-----|--|------|--|--|--|--|--|--|--|
| 120 | | 0.00 | | | | | | | |
|-----|--|------|--|--|--|--|--|--|--|

120

Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

1-Turn second side as per Folio FA647
2- File transition lines smooth.
3-Scribe part # as per Dwg D350-748-241
FOLIO REV: A
DWG REV: E

0.00

l φ

man.l
17/03/25

| | | | | | | | | | |
|-----|--|------|--|--|--|--|--|--|--|
| 130 | QC1- Inspect dimensions to dimension sheet | 0.00 | | | | | | | |
|-----|--|------|--|--|--|--|--|--|--|

130

QC

Quality Control

Memo

0.00

l φ

man.l
17/03/25

| | | | | | | | | | |
|-----|-----------------------------------|------|--|--|--|--|--|--|--|
| 140 | QC8- Inspect parts - second check | 0.00 | | | | | | | |
|-----|-----------------------------------|------|--|--|--|--|--|--|--|

140

QC

Quality Control

Memo

0.00

W 13-07-24

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: _____ Date: _____

QA Closed: _____ Date: _____

| | | | | | | | | | | | | | | | | | | |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____ Part No. _____ NCR No. _____ | DISPOSITION Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/> | AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | |
| Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | | | | | | | | | | | | | | | | |

| Root Cause | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|---------------|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data | | | | | | | | | |
| Equip/Tooling | | | | | | | | | |
| Operator | | | | | | | | | |
| Material | | | | | | | | | |
| Setup | | | | | | | | | |
| Other | | | | | | | | | |
| Process | | | | | | | | | |
| Supplier | | | | | | | | | |
| Training | | | | | | | | | |
| Unapproved | | | | | | | | | |

FAULT CATEGORY

| | | |
|---|---|---|
| Landing Gear <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube | General <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio | <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions |
| | | <input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge |
| | | <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Other |

Work Order ID 97878

March-01-13 10:38:06 AM

97878

Page 3

Item ID: D350-748-241TRN

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 3/01/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 3/15/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

150

0.00

150

Large Fab

Crosstubes

Memo

0.00

Crosstubes

1-DRILL HOLES FOR HEAT TREAT USING DT9806(HOLES MUST BE
ALIGNED ON SAME LINE ON BOTH CUFFS)

JW 13-07-29

2-Grind machining marks

> RB 13-07-29

160

Outsource process - Heat Treat

0.00

160

Outsource I

Memo

0.00

Outsource process - Heat Treat

Issue P/O:

20833

Heat Treat to min 180 KSI As per Dwg D350-748-241

CZ 13081070

***Check for straighten and ensure parts are straight within 1/8" as per dwg ***

Sand Blast tube after Heat Treat

Possible Supplier: Vac Aero

Ensure Certificate of Conformity is attached

21265

CZ 13/09/10 ①

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: _____ Date: _____

QA Closed: _____ Date: _____

| | | | | | | | | | | | | | | | | | | |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____ Part No. _____ NCR No. _____ | DISPOSITION Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/> | AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | |
| Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | | | | | | | | | | | | | | | | |

| Root Cause | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|--|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data <input type="checkbox"/> | | | | | | | | | |
| Equip/Tooling <input type="checkbox"/> | | | | | | | | | |
| Operator <input type="checkbox"/> | | | | | | | | | |
| Material <input type="checkbox"/> | | | | | | | | | |
| Setup <input type="checkbox"/> | | | | | | | | | |
| Other <input type="checkbox"/> | | | | | | | | | |
| Process <input type="checkbox"/> | | | | | | | | | |
| Supplier <input type="checkbox"/> | | | | | | | | | |
| Training <input type="checkbox"/> | | | | | | | | | |
| Unapproved <input type="checkbox"/> | | | | | | | | | |

FAULT CATEGORY

| Landing Gear | General | Other |
|---|---|--|
| <input type="checkbox"/> Bending | <input type="checkbox"/> Bend | <input type="checkbox"/> Grain |
| <input type="checkbox"/> Centre Not Concentric to O/S | <input type="checkbox"/> BOM/Route | <input type="checkbox"/> Hardware |
| <input type="checkbox"/> Cracks | <input type="checkbox"/> Broken/Damaged | <input type="checkbox"/> Inspection Incomplete |
| <input type="checkbox"/> Crushed/Crimped | <input type="checkbox"/> Burrs | <input type="checkbox"/> Instructions Incomplete/Unclear |
| <input type="checkbox"/> Cuffs | <input type="checkbox"/> Contamination | <input type="checkbox"/> Maintenance |
| <input type="checkbox"/> Heat Treat | <input type="checkbox"/> Countersink | <input type="checkbox"/> Misabeled |
| <input type="checkbox"/> Inspection Strip in Tube | <input type="checkbox"/> Cut Too Short | <input type="checkbox"/> Misread |
| <input type="checkbox"/> Ripples in Bend | <input type="checkbox"/> Drill Holes | <input type="checkbox"/> Offset |
| <input type="checkbox"/> Torque Waves in Extrusion | <input type="checkbox"/> Drawing | <input type="checkbox"/> Out of Calibration |
| <input type="checkbox"/> Turning Sequence | <input type="checkbox"/> Finish | <input type="checkbox"/> Out of Sequence |
| <input type="checkbox"/> Wave/Twist in Tube | <input type="checkbox"/> Folio | <input type="checkbox"/> Outside Dimensions |
| | | <input type="checkbox"/> Ovalized |
| | | <input type="checkbox"/> Over/Under tolerance |
| | | <input type="checkbox"/> Part Incorrect |
| | | <input type="checkbox"/> Part Lost/Missing |
| | | <input type="checkbox"/> Part Moved |
| | | <input type="checkbox"/> Positioned Wrong |
| | | <input type="checkbox"/> Power Loss/Surge |
| | | <input type="checkbox"/> Pressure/Forced |
| | | <input type="checkbox"/> Temperature/Cure |
| | | <input type="checkbox"/> Weld |
| | | <input type="checkbox"/> Wrong Stock Pulled |
| | | <input type="checkbox"/> Other |

Work Order ID 97878

97878

March-01-13 10:38:06 AM

Item ID: D350-748-241TRN

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 3/01/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 3/15/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

170 Receive & Inspect for Damage & Mat'l Certs 0.00

170

Packaging

Memo

0.00

Packaging

Ensure certificate of conformaty is attached

43/8/25C
43/4/4C

180 QC6- Inspect dimensions to drawing 0.00

180

QC

Memo

0.00

Quality Control

DAS
16
9-89 13/08/29

190 Packaging 0.00

190

Packaging

Memo

0.00

Packaging

Identify and stock in kanban rack
Location: 16

W 13-10-18

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: _____ Date: _____

QA Closed: _____ Date: _____

| | | | | | | | | | | | | | | | | | | |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____ Part No. _____ NCR No. _____ | DISPOSITION Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/> | AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | |
| Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | | | | | | | | | | | | | | | | |

| Root Cause | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|--|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data <input type="checkbox"/> | | | | | | | | | |
| Equip/Tooling <input type="checkbox"/> | | | | | | | | | |
| Operator <input type="checkbox"/> | | | | | | | | | |
| Material <input type="checkbox"/> | | | | | | | | | |
| Setup <input type="checkbox"/> | | | | | | | | | |
| Other <input type="checkbox"/> | | | | | | | | | |
| Process <input type="checkbox"/> | | | | | | | | | |
| Supplier <input type="checkbox"/> | | | | | | | | | |
| Training <input type="checkbox"/> | | | | | | | | | |
| Unapproved <input type="checkbox"/> | | | | | | | | | |

FAULT CATEGORY

| | | |
|---|---|--|
| Landing Gear <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube | General <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio | <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions <input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Other |
|---|---|--|

Work Order ID 97878

97878

March-01-13 10:38:06 AM

Item ID: D350-748-241TRN

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 3/01/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 3/15/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start ***NR1***

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop ***NR2***

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

200

QC21- Final Inspection - Work Order Release

0.00

200

QC

Memo

0.00

Quality Control

Handwritten: 13/10/18
ME
13-10-17

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: _____ Date: _____

QA Closed: _____ Date: _____

| | | | | | | | | | | | | | | | | | | |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____ Part No. _____ NCR No. _____ | DISPOSITION Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/> | AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | |
| Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | | | | | | | | | | | | | | | | |

| Root Cause | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|---------------|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data | | | | | | | | | |
| Equip/Tooling | | | | | | | | | |
| Operator | | | | | | | | | |
| Material | | | | | | | | | |
| Setup | | | | | | | | | |
| Other | | | | | | | | | |
| Process | | | | | | | | | |
| Supplier | | | | | | | | | |
| Training | | | | | | | | | |
| Unapproved | | | | | | | | | |

FAULT CATEGORY

| | | |
|---|---|--|
| Landing Gear <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube | General <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio | <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions <input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Other |
|---|---|--|

Picklist Print

March-01-13 10:38:09 AM

Page 1

Work Order ID: 97878

97878

Parent Item: D350-748-241TRN

D350-748-241TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 3/01/13

Required Date: 3/15/13

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec
 IPP Rev B Removed polish 08.04.02 EC verified by : DD
 IPP Rev C Removed LPS-3 08.06.23 Ec verified by: DD IPP Rev D
 11.02.24 as per dwg rev.F DD verf: JLM

| Component Item ID/ Item Name | Replacement Item ID | Mfg/ Purch | Bin Item | Primary Location | Last Location | Route Seq ID | Unit of Measure | Qty on Hand | Qty per Kit | Total Qty | Qty Issued | Date Issued | Status |
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
| D6015-125 | | Manufactured | No | | | 120 | Each | 104.0000 | 1 | 1 | | | |

D6015-125

**

Crosstube Material

Location

Loc Qty

Loc Code

HALL

104

81022

24

95226

80

1 amm.c 13/03/23

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: _____ Date: _____

QA Closed: _____ Date: _____

| | | | | | | | | | | | | | | | | | | |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____ Part No. _____ NCR No. _____ | DISPOSITION Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/> | AGAINST DEPARTMENT/PROCESS <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">Skid-tube <input type="checkbox"/></td> <td style="width: 33%;">Crosstube <input type="checkbox"/></td> <td style="width: 33%;">Water Jet <input type="checkbox"/></td> <td style="width: 33%;">Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | |
| Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> | | | | | | | | | | | | | | | | |

| Root Cause | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|---------------|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data | | | | | | | | | |
| Equip/Tooling | | | | | | | | | |
| Operator | | | | | | | | | |
| Material | | | | | | | | | |
| Setup | | | | | | | | | |
| Other | | | | | | | | | |
| Process | | | | | | | | | |
| Supplier | | | | | | | | | |
| Training | | | | | | | | | |
| Unapproved | | | | | | | | | |

FAULT CATEGORY

| Landing Gear | General | Other |
|---|---|--|
| <input type="checkbox"/> Bending | <input type="checkbox"/> Bend | <input type="checkbox"/> Grain |
| <input type="checkbox"/> Centre Not Concentric to O/S | <input type="checkbox"/> BOM/Route | <input type="checkbox"/> Hardware |
| <input type="checkbox"/> Cracks | <input type="checkbox"/> Broken/Damaged | <input type="checkbox"/> Inspection Incomplete |
| <input type="checkbox"/> Crushed/Crimped | <input type="checkbox"/> Burrs | <input type="checkbox"/> Instructions Incomplete/Unclear |
| <input type="checkbox"/> Cuffs | <input type="checkbox"/> Contamination | <input type="checkbox"/> Maintenance |
| <input type="checkbox"/> Heat Treat | <input type="checkbox"/> Countersink | <input type="checkbox"/> Mislabeled |
| <input type="checkbox"/> Inspection Strip in Tube | <input type="checkbox"/> Cut Too Short | <input type="checkbox"/> Misread |
| <input type="checkbox"/> Ripples in Bend | <input type="checkbox"/> Drill Holes | <input type="checkbox"/> Offset |
| <input type="checkbox"/> Torque Waves in Extrusion | <input type="checkbox"/> Drawing | <input type="checkbox"/> Out of Calibration |
| <input type="checkbox"/> Turning Sequence | <input type="checkbox"/> Finish | <input type="checkbox"/> Out of Sequence |
| <input type="checkbox"/> Wave/Twist in Tube | <input type="checkbox"/> Folio | <input type="checkbox"/> Outside Dimensions |
| | | <input type="checkbox"/> Ovalized |
| | | <input type="checkbox"/> Over/Under tolerance |
| | | <input type="checkbox"/> Part Incorrect |
| | | <input type="checkbox"/> Part Lost/Missing |
| | | <input type="checkbox"/> Part Moved |
| | | <input type="checkbox"/> Positioned Wrong |
| | | <input type="checkbox"/> Power Loss/Surge |
| | | <input type="checkbox"/> Pressure/Forced |
| | | <input type="checkbox"/> Temperature/Cure |
| | | <input type="checkbox"/> Weld |
| | | <input type="checkbox"/> Wrong Stock Pulled |
| | | <input type="checkbox"/> Other |

| | |
|---|----------------------------------|
| DART AEROSPACE LTD | Work Order: 97878 |
| Description: Crosstube Assembly (AS350/355 High Aft) | Part Number: D350-748-241 |
| Inspection Dwg: D350-748-241 Rev: G | Page 1 of 2 |

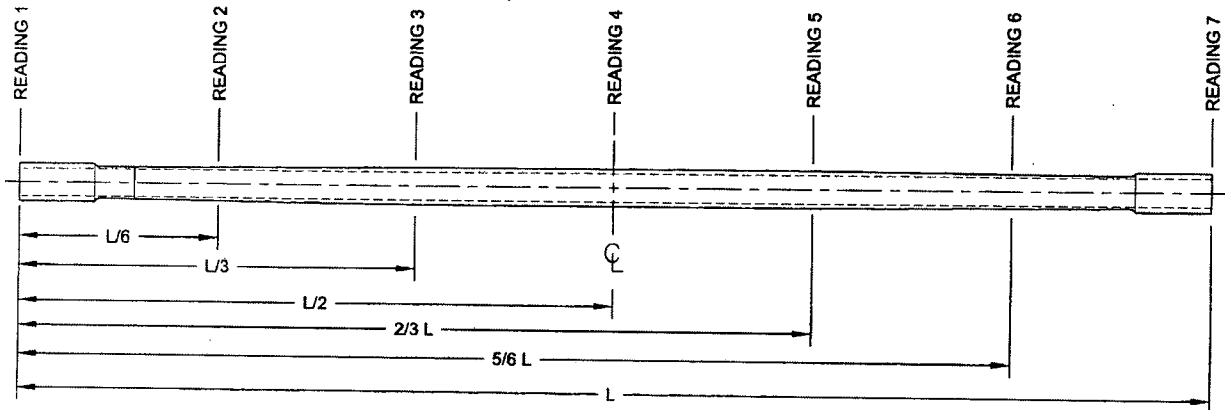
FIRST ARTICLE INSPECTION CHECKLIST

| | Inspection Sheet Drawing Dimension | Tolerance | Actual Dimension | Accept | Reject | Method of Inspection | Comments |
|--------|---------------------------------------|---------------|---------------------|--------|--------|-------------------------|----------|
| SIDE A | 2.240 | +0.005/-0.000 | 2.244 | ✓ | | vern | CNC-08 |
| | 2.180 | +0.005/-0.000 | 2.185 | ✓ | | ↓ | |
| | 2.180 | +0.005/-0.000 | 2.184 | ✓ | | | |
| | 2.208 | +0.005/-0.000 | 2.212 | ✓ | | | |
| | 2.234 | +0.005/-0.000 | 2.239 | ✓ | | | |
| | 2.253 | +0.005/-0.000 | 2.257 | ✓ | | | |
| | 2.272 | +0.005/-0.000 | 2.276 | ✓ | | | |
| | 2.299 | +0.005/-0.000 | 2.305 | ✓ | | | |
| | 0.063 | +/-0.010 | .063 | ✓ | | vern | CNC-08 |
| | 5.25 | +/-0.060 | 5.25 | ✓ | | " | |
| | R0.063 | +/-0.010 | .063 | ✓ | | R6 | |
| | R0.50 | +/-0.030 | .500 | ✓ | | " | |
| | | | | | | | |
| | | | | | | | |
| SIDE B | 2.240 | +0.005/-0.000 | 2.244 | ✓ | | vern | CNC-08 |
| | 2.180 | +0.005/-0.000 | 2.184 | ✓ | | ↓ | |
| | 2.180 | +0.005/-0.000 | 2.183 | ✓ | | | |
| | 2.208 | +0.005/-0.000 | 2.212 | ✓ | | | |
| | 2.234 | +0.005/-0.000 | 2.239 | ✓ | | | |
| | 2.253 | +0.005/-0.000 | 2.257 | ✓ | | | |
| | 2.272 | +0.005/-0.000 | 2.276 | ✓ | | | |
| | 2.299 | +0.005/-0.000 | 2.305 | ✓ | | | |
| | 0.063 | +/-0.010 | .063 | ✓ | | vern | CNC-08 |
| | 5.25 | +/-0.060 | 5.25 | ✓ | | " | |
| | R0.063 | +/-0.010 | .063 | ✓ | | R6 | |
| | R0.50 | +/-0.030 | .500 | ✓ | | " | |
| | | | | | | | |
| | | | | | | | |
| | 122.70 | +/-0.060 | 124.700 | ✓ | + | tape | LG-15 |

124.700

| | | | |
|---|--|---------------------|--------------|
| DART AEROSPACE LTD | | Work Order: | 97878 |
| Description: Crosstube Assembly (AS350/355 High Aft) | | Part Number: | D350-748-241 |
| Inspection Dwg: D350-748-241 Rev: G | | Page 2 of 2 | |

WALL THICKNESS MEASUREMENT



| Location | WALL THICKNESS MEASUREMENT (IN) | | | | Deviation Δw (max-min) | TOLERANCE |
|--------------------|---------------------------------|------|------|------|--------------------------------------|-----------|
| | w1 | w2 | w3 | w4 | | |
| READING 1 L= 0" | .128 | .119 | .124 | .134 | .015 | 0.030" |
| READING 2 L= 14 | .098 | .098 | .098 | .097 | .001 | |
| READING 3 L= 29 | .134 | .131 | .131 | .134 | .003 | |
| READING 4 L= 62 | .149 | .153 | .161 | .159 | .012 | |
| READING 5 L= 29 | .139 | .115 | .129 | .149 | .034 | |
| READING 6 L= 14 | .100 | .079 | .097 | .114 | .035 | |
| READING 7 L= 62 | .127 | .126 | .125 | .129 | .009 | |

0.126 0.611
0.091 0.612

Calibration Result

Actual Block Thickness: 100 .500

Sitiescan 250 Measured Thickness: 100 .500

| | |
|---------------------|------------|
| Measured by: | <i>mmk</i> |
| Date: | 13/04/08 |

| | |
|--------------------|----------|
| Audited by: | <i>W</i> |
| Date: | 13-07-29 |

| | |
|------------------------------|--|
| Preliminary Approval: | |
| Date: | |

| Rev | Date | Change | Revised by | Approved |
|-----|----------|------------------------------|-----------------------|----------|
| A | 07.01.17 | New Issue (P/O D350-748-201) | KJ/JLM | |
| B | 12.02.02 | Dwg Rev updated | KJ | |
| C | 12.06.04 | Wall thickness form added | KJ | |
| D | 13.02.27 | Dimension 5.25 was 4.26 | KJ <i>[Signature]</i> | <i>M</i> |

| Item | Qty -241 | Part Number | Description |
|------|-------------|-----------------------------|---|
| 1 | X | D350-748-241 | CROSSTUBE ASSEMBLY (AS 350/355 HI AFT) |
| 2 | 1 | D6015-125 | CROSSTUBE (OR D6018-125) |
| 3 | 2 | D3502-1 | SUPPORT |
| 4 | 2 | D3595-063-395 | RUBBER CUSHION |
| 5 | 1 | AELS-1032-225 | INSERT |
| 6 | 1 | NAS1149D0363J | WASHER (OR AN960JD10) |
| 7 | 2 | MS21920-22 OR MS21920-21 | CLAMP (PER DART SPEC. M-MS21920-21/-22) |
| 8 | 1 | MS27039-1-10 | SCREW |
| 9 | A/R | PROSEAL 890 B-2 | SEALANT, AMS-S-8802 CLASS B-2 |

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6015-125 OR D6018-125
FINISHED LENGTH AFTER TURNING = 124.70±0.06 (AFTER BENDING/TRIMMING = 122.70 REF)
- FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- WEIGHT: 29.85 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS2759/1E AFTER TURNING. ACCEPTABLE TO VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.

BENDING

- ALL DIMENSIONS FOR BENT TUBE ARE POST STRESS RELIEF
- BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 7% ON BOTTOM HALF OF BEND.
- MAX AMPLITUDE OF RIPPLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- AFTER BENDING, STRESS RELIEVE TUBE AT 650°F ±0.25°F FOR A MINIMUM OF 2 HRS AND ALLOW TO COOL TO AMBIENT TEMPERATURE (REF AMS2759/1E).
- MAX TWIST AFTER STRESS RELIEF: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- TORQUE CLAMPS 80 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

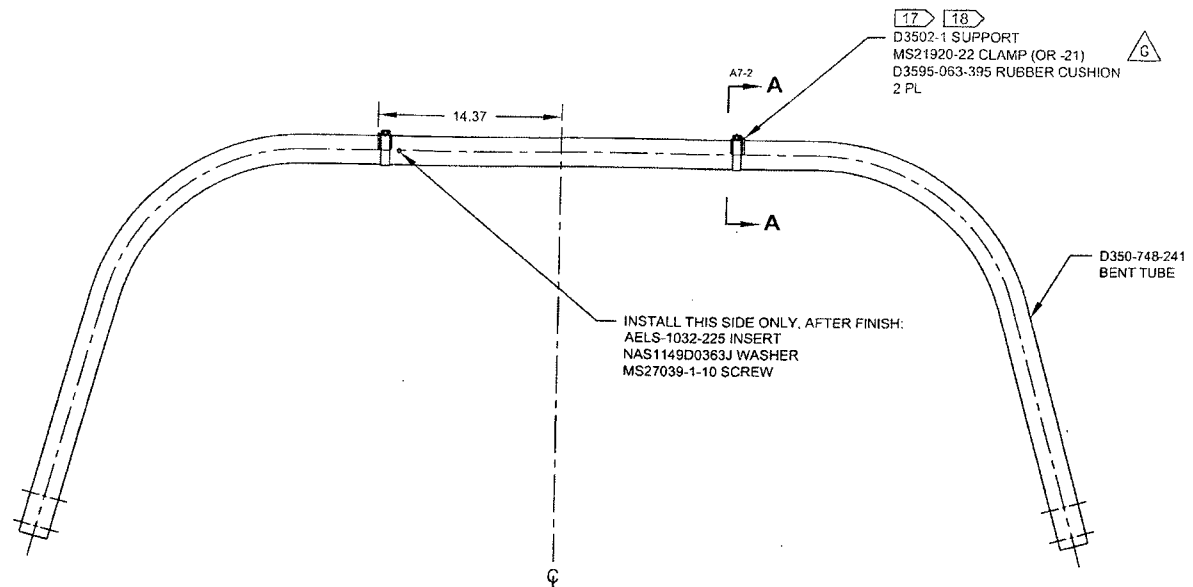
NEW COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO A FURTHER
WITHOUT NOTICE
WORK ORDER

97878 MCT
1303-01

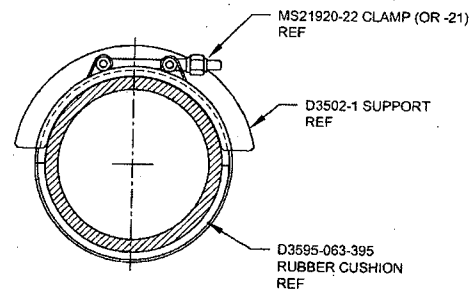
RELEASE
2012-11-01

| | | | |
|------------|--|--|--------------|
| G | RMV ABRASION STRIP. SUPPORT NOW W/ PROSEAL & CUSHION. ADD STRESS RELIEF, LONGER CUFF, NOW TRIM'D AFTER BEND, ADD WALL DIMS & UPDATE TOL. | CP | 12.09.12 |
| F | ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3). ADD D6015-125 OPTION (C8-1). STOCK DIM NOW MACHINED (D1-4) | CP | 10.11.23 |
| E | REVISE GENERAL NOTES: UPDATE TO CURRENT STANDARDS: RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C6-3, D2-3) | RF | 09.09.30 |
| D | MAG. PARTICLE AND CAD PLATE AS MFD. | CP | 06.10.31 |
| C | ADD CAD PLATING | CP | 06.08.14 |
| B | ADD D6018-125 & PRIME AND PAINT | CP | 06.06.30 |
| A | NEW ISSUE | CP | 06.03.31 |
| REV. | DESCRIPTION | BY | DATE |
| DESIGN | <i>97</i> | DART AEROSPACE LTD | |
| DRAWN | <i>97</i> | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | <i>A.P.</i> | DRAWING NO. | REV. G |
| MFG. APPR. | <i>[Signature]</i> | D350-748-241 | SHEET 1 OF 4 |
| APPROVED | <i>[Signature]</i> | TITLE | SCALE |
| DE APPR. | <i>[Signature]</i> | CROSSTUBE (AS 350/355 HI AFT) | NTS |
| DATE | 12.09.12 | COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. | |

97878



**D350-748-241
ASSEMBLY DETAIL**

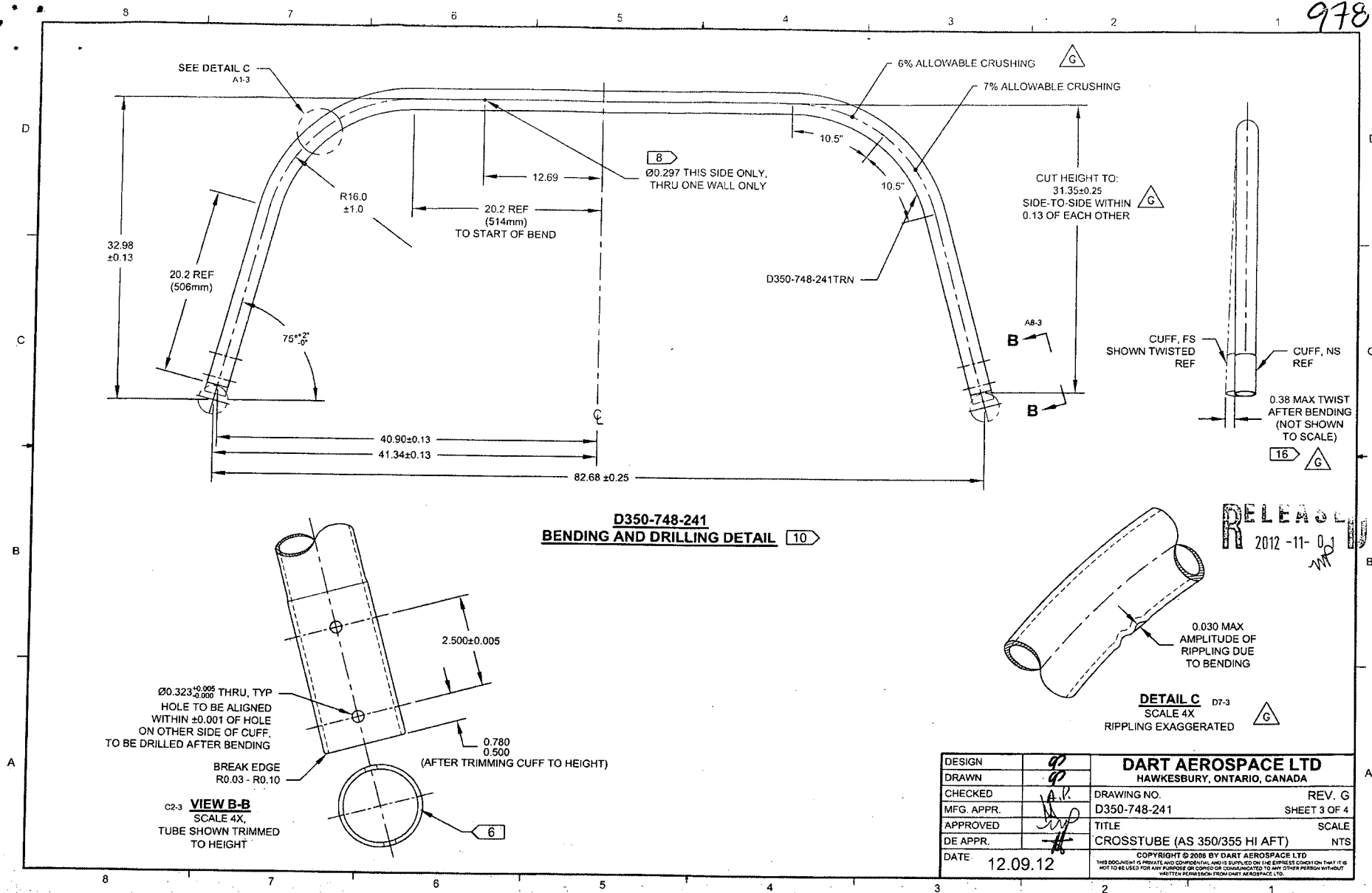


SECTION A-A D4-2
SCALE 6X

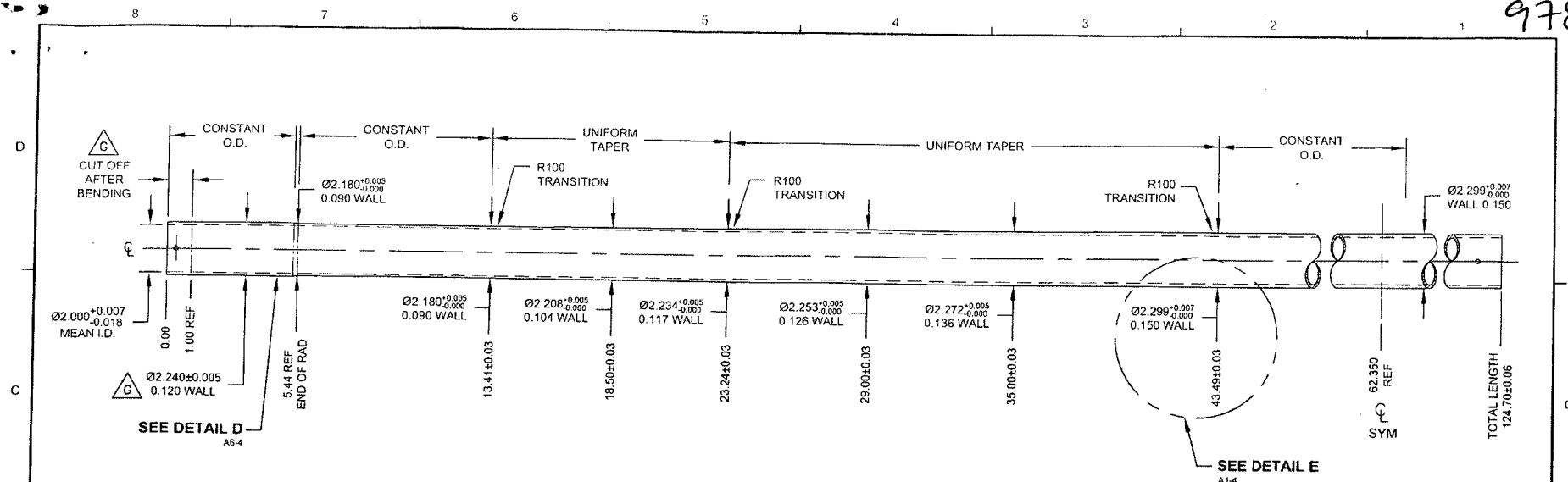
RELEASED
2012-11-01

| | | | |
|------------|-------------|--|--------------|
| DESIGN | 90 | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| DRAWN | 90 | | |
| CHECKED | A.O. | DRAWING NO. | REV. G |
| MFG. APPR. | [Signature] | D350-748-241 | SHEET 2 OF 4 |
| APPROVED | [Signature] | TITLE | SCALE |
| DE APPR. | [Signature] | CROSSTUBE (AS 350/355 HI AFT) | NTS |
| DATE | 12.09.12 | <small>COPYRIGHT © 2005 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small> | |

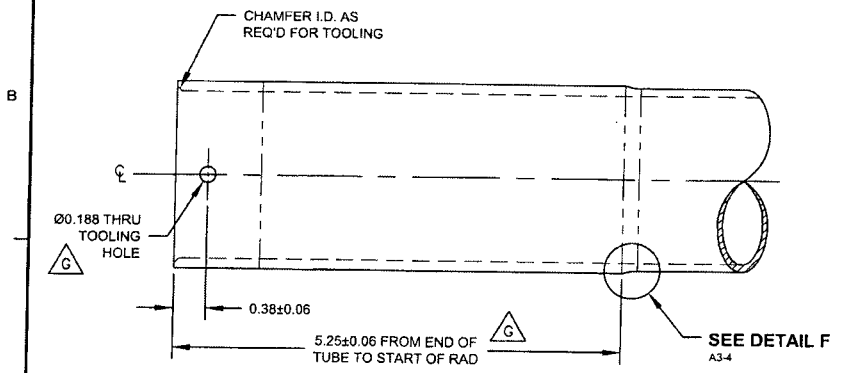
97878



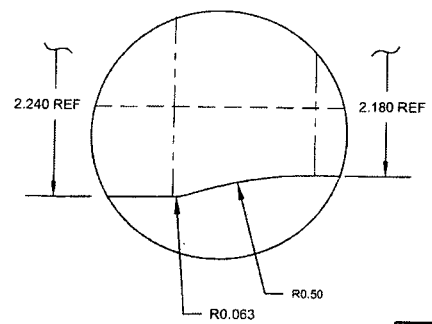
97878



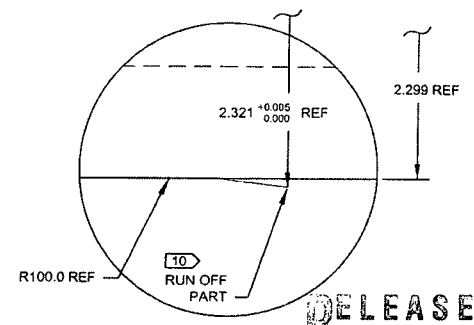
**D350-748-241TRN
TURNING DETAIL**



**DETAIL D:
CROSSTUBE CUFF** C7-4
SCALE 3X



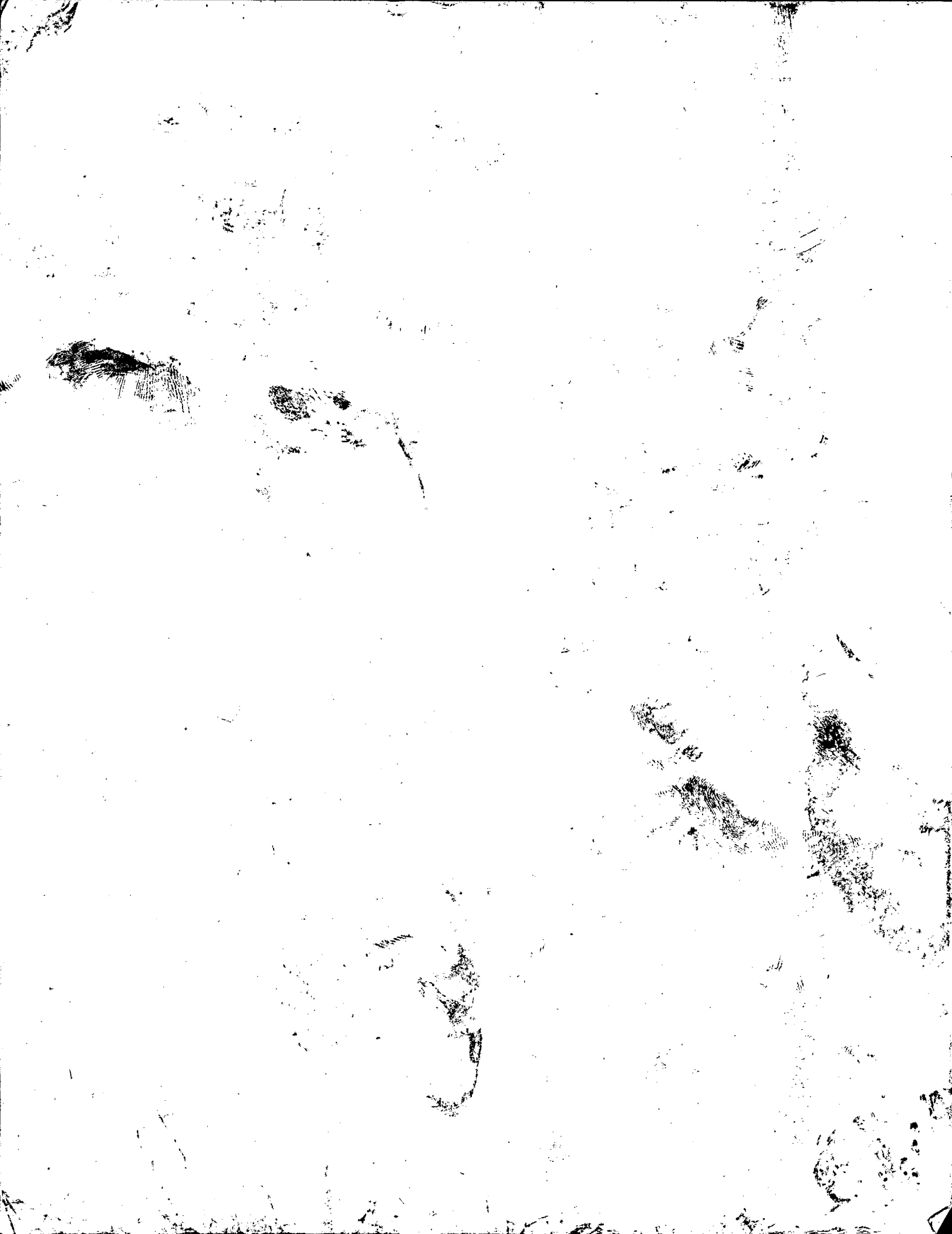
**DETAIL F:
CUFF TRANSITION** A5-4
NOT TO SCALE



**DETAIL E:
TAPER RUN-OFF** C2-4
NOT TO SCALE

| | | | |
|------------|----------|--|--------------|
| DESIGN | | DART AEROSPACE LTD | |
| DRAWN | | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | | DRAWING NO. | REV. G |
| MFG. APPR. | | D350-748-241 | SHEET 4 OF 4 |
| APPROVED | | TITLE | SCALE |
| DE APPR. | | CROSSTUBE (AS 350/355 HI AFT) | NTS |
| DATE | 12.09.12 | <small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small> | |

RELEASED
2012-11-11





1000 E. Mermaid La., Wyndmoor (Phila.) PA 19038-8093
Tel. (215) 233-2600 Fax (215) 233-5653

Certification

SOLD TO

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7

August 22, 2013

| | |
|------------------------------|---|
| Metlab Shop Order No: | 78675 |
| Purchase Order: | <u>PO20833</u> |
| Part No.: | <u>D350-748-141 TRN, D350-748-241 TRN</u> |
| Quantity: | 17 Pieces |
| Weight: | 800 Pounds |
| Material: | 4130 Alloy Steel |
| Specifications: | Harden and temper IAW the applicable sections of AMS 2759-1C to 180 KSI minimum ultimate tensile strength |

This is to certify that the above parts were processed as indicated above and conform to the specification requirements.

Results:

Ultimate Tensile Strength: 194/208 KSI*

Surface Hardness: 42/44 HRC

*Converted from surface hardness using Table 2A of ASTM A370

METLAB

Quality Representative Mark Jenkins

MERCURY CONTAMINATION: During the heat treating process, testing and inspections, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing device.



Heat Treating and Metallurgical Consulting

D 350 TRN's HEAT TREATED AT METLAB

| TYPE | BATCH # | PO # | CUFF DIA SIDE A TWO READINGS | | CUFF DIA SIDE B TWO READINGS | | CENTER DIAMETER HEAT TREATING | | LENGTH AFTER HEAT TREATING |
|------|---------|---------|---------------------------------|--------|---------------------------------|--------|----------------------------------|--------|-------------------------------|
| FWD | B103234 | PO20833 | 2.255" | 2.256" | 2.261" | 2.233" | 2.336" | 2.331" | 112.500" |
| FWD | B103233 | PO20833 | 2.243" | 2.237" | 2.252" | 2.248" | 2.345" | 2.328" | 112.400" |
| FWD | B103232 | PO20833 | 2.247" | 2.247" | 2.251" | 2.241" | 2.339" | 2.329" | 112.400" |
| FWD | B103231 | PO20833 | 2.246" | 2.240" | 2.254" | 2.236" | 2.333" | 2.330" | 112.400" |
| FWD | B103236 | PO20833 | 2.252" | 2.248" | 2.253" | 2.239" | 2.334" | 2.331" | 112.400" |
| FWD | B103229 | PO20833 | 2.253" | 2.249" | 2.254" | 2.238" | 2.334" | 2.329" | 112.500" |
| FWD | B103230 | PO20833 | 2.255" | 2.252" | 2.258" | 2.236" | 2.333" | 2.330" | 112.500" |
| FWD | | | | | | | | | |
| FWD | | | | | | | | | |
| FWD | | | | | | | | | |
| FWD | | | | | | | | | |
| | | | | | | | | | |
| AFT | B103245 | PO20833 | 2.257" | 2.247" | 2.259" | 2.247" | 2.294" | 2.291" | 124.900" |
| AFT | B103244 | PO20833 | 2.253" | 2.246" | 2.250" | 2.239" | 2.299" | 2.296" | 124.900" |
| AFT | B103243 | PO20833 | 2.257" | 2.246" | 2.247" | 2.240" | 2.304" | 2.290" | 125.000" |
| AFT | B103242 | PO20833 | 2.245" | 2.243" | 2.262" | 2.231" | 2.300" | 2.293" | 125.000" |
| AFT | B103241 | PO20833 | 2.247" | 2.244" | 2.256" | 2.244" | 2.295" | 2.295" | 125.000" |
| AFT | B103240 | PO20833 | 2.253" | 2.249" | 2.264" | 2.231" | 2.300" | 2.295" | 124.900" |
| AFT | B103239 | PO20833 | 2.254" | 2.254" | 2.253" | 2.238" | 2.303" | 2.290" | 125.000" |
| AFT | B103237 | PO20833 | 2.256" | 2.252" | 2.256" | 2.243" | 2.297" | 2.290" | 124.900" |
| AFT | B97878 | PO20833 | 2.247" | 2.245" | 2.253" | 2.244" | 2.303" | 2.293" | 124.900" |
| AFT | | | | | | | | | |
| AFT | | | | | | | | | |
| AFT | | | | | | | | | |

DAS
16
9-89

13/08/28

NOTES:

D350-748-241 TRN B97879 Cracked during straightening at heat treating
NCR 13-2982 is created about this tube cracking



1000 E. Mermaid La., Wyndmoor (Phila.) PA 19038-8093
Tel. (215) 233-2600 Fax (215) 233-5653

Certification

SOLD TO

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7

September 26, 2013

| | |
|-----------------------|--|
| Metlab Shop Order No: | 79132 |
| Purchase Order: | PO21265 |
| Part No.: | D350-748-141TRN, D350-748-241TRN |
| ID No.: | 103231, 103236, 103234, 103232, 103239, 103244, 103241, 97878, 103245, 103240, 103237, 103242, 103243 |
| Description: | Cross Tube |
| Quantity: | 13 Pieces (4, 9) |
| Weight: | 310 Pounds |
| Material: | 4130 Alloy Steel |
| Specifications: | Harden and temper to 180 KSI minimum ultimate tensile strength |

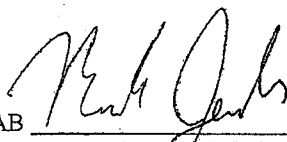
This is to certify that the above parts were processed as indicated above with the following results

Results:

Ultimate Tensile Strength: 170/181 KSI*

Surface Hardness: 38/40 HRC

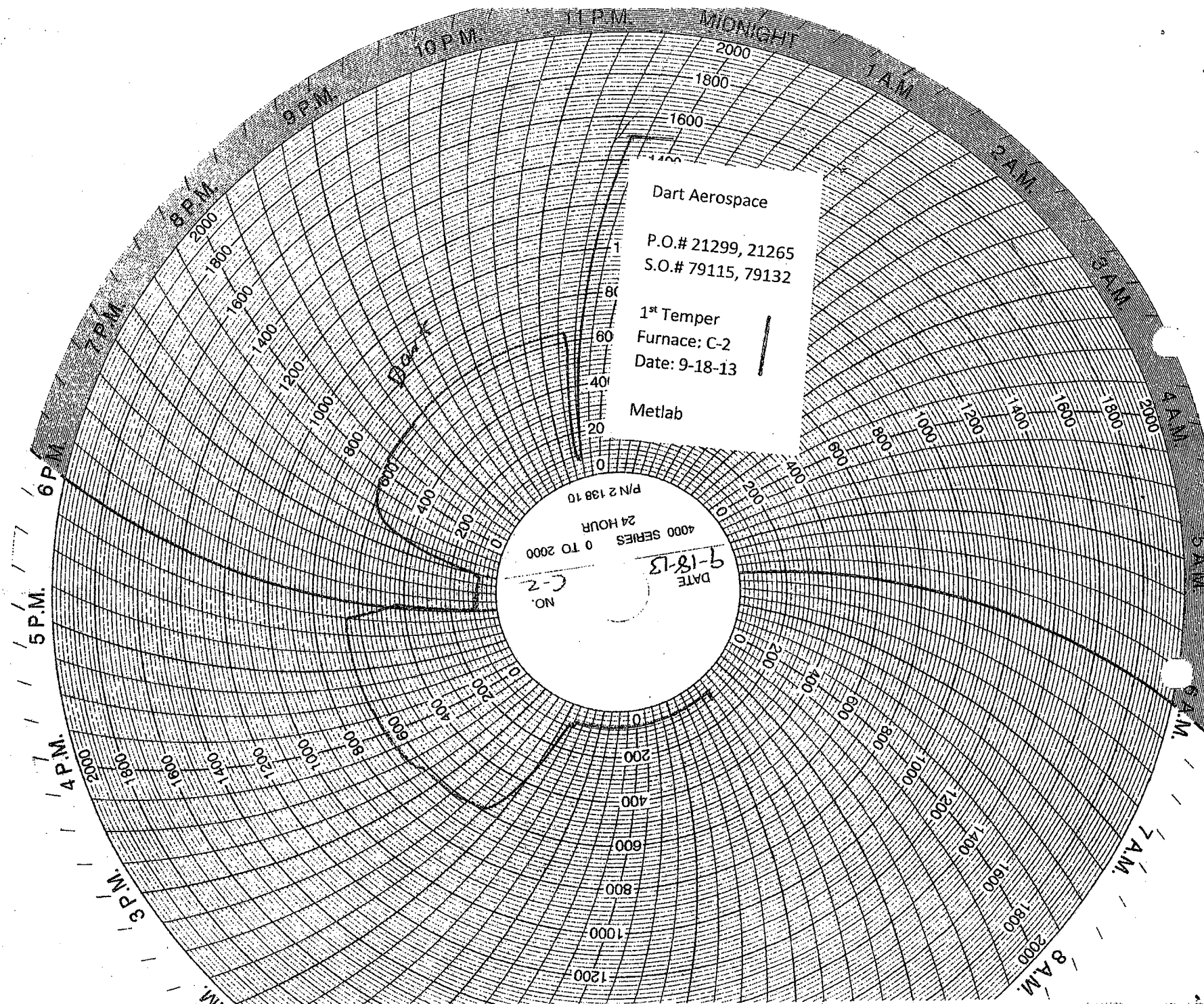
*Converted from surface hardness


METLAB
Quality Representative Mark Jenkins

MERCURY CONTAMINATION: During the heat treating process, testing and inspections, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing device.



Heat Treating and Metallurgical Consulting



Dart Aerospace

P.O.# 21299, 21265

S.O.# 79115, 79132

1st Temper

Furnace: C-2

Date: 9-18-13

Metlab

NO. C-2
DATE 9-18-13
4000 SERIES 0 TO 2000
24 HOUR
P/N 2 138 10